one course of arsphenamine-mercury as above outlined, it is customary to give a rest period of three weeks, after which a blood Wassermann test is made. If negative, another course of mercury is given, while if positive the entire arsphenamine-mercury series is repeated. The late cases also receive six weekly injections of arsphenamine accompanied by mercury, the latter being frequently given in solution as biniodide. Iodides are administered as indicated, the potassium salt being preferred, prescribed as a saturated solution. All cases having a negative blood Wassermann taken at three months, six months, one year and two years, *after thorough and complete* courses of treatment, accompanied by a negative spinal fluid and free of clinical signs are tentatively classed as "cured," but are instructed to report semi-annually for observation. This criterion of a "cure" we have rather arbitrarily adopted and feel that it is perhaps too rigid, but one under which we can conscientiously sanction marriage. Even then, we advocate further medication yearly for several years, depending upon the case and conditions. The provocative Wassermann is too uncertain to be of value, as shown in a recent thesis by Ruth Shepardson of our clinic. The luetin tests also are worthless, as shown by Alderson's work with commercial luetin.

The ideal treatment of syphilis has not yet been found. Some prefer the old salvarsan, some the neoarsphenamine and others the later and newer preparations. Mercury is used as rubs by some and by mouth or by injection by others. Regardless of the individual choice *we do know* that the infection *must be seen early and vigorously and persistently treated with all the means* at our disposal for a prolonged time, if we hope to get a permanent cure. Even then, it will take years to determine a definite cure.

Medicine a Service—Medicine is a profession of service and not a commercial venture; any attempt to make it so will end in discredit and usually failure. True, we must live by our work, but in my life I have never seen the man who works for the joy of it, go hungry or his children begging for bread. It is the law of life that he who gives most gets most, and the men who give most are usually the men who are accomplishing most in every walk of life. I have often thought if the young men in medicine knew the joy of God's open country, more of them would be country doctors.—Kay in American Medical Press, September, 1922.

"Each State hospital owes to its patients complete medical service," says Mr. A. L. Bowen in an article in The Modern Hospital. "A State hospital medical service to be complete must be prepared to give each patient, both on his arrival and at frequent intervals during his stay, every possible advantage that he could get in the very best private general hospital; everything, indeed, that will help to place him in first-class condition physically, and to adjust himself mentally to his environment, so that he may resume within his limitations the pursuit of occupation, recreation, and the pleasures of life. These privileges will render his stay in the institution serviceable to it and to himself."—The Modern Hospital, August, 1922.

THE DIFFERENTIAL PUPILLOSCOPE *

By OTTO BARKAN, M. D., San Francisco

Some ten years ago, during his attempts to determine the absence or presence of color vision in animals, C. Hess devised an instrument which gave a quantitative measure of the sensibility of the pupillary reaction.

In subsequent years the clinical significance of the method became apparent and it was adapted to clinical use. Inasmuch as it gives us a norm for the light reaction of the pupil, is free from all sources of error, is independent of the state of adaptation and age of the individual, it has become of considerable diagnostic aid in clinical medicine as well as in the restricted field of ophthalmology. The method was published two years ago. From my own experience I do not doubt that in the course of the next few years it will become a necessary adjunct to every well-equipped institution and also, even if to a more limited extent, in the dark-room of the specialist.

The underlying principle of the method, though simple in itself, is so unfamiliar to our modes of thought that it is at first not easy of conception. For its detailed description the reader is referred to the original articles. Let it suffice to state that with this instrument we measure the reactivity of the pupil by determining quantitatively the least difference of light intensity which is necessary to produce a reaction. It has been found that physiologically the pupil does not react to a difference of light which is less than 95 to 100. When the difference of light is greater than this the pupil responds with contraction upon appearance of the brighter light. The difference of light intensity necessary to just cause a reaction is thus a measure of the sensibility of the pupillary reaction and therewith of the reflex arc entailed. The importance of the determination of such a norm immediately becomes apparent. It is not influenced by opacities of the media, such as cataract, nor by refractive errors. Nor does the pupillary play interfere in practice with the examination.

The nature and localization of fundus lesions which may affect the reaction have been worked out. Thus it has been found, and this is in harmony with other recent researches, that lesions of the macular region only affect the pupillary reaction. Thus, also it has been found that primary optic atrophy does not affect the reactivity until vision is diminished to 3-10 and that from this point on the two proceed pari passu.

The patient's subjective sensibility to difference of light can also be measured, and it has been found that so long as the light differences are sufficient to cause the pupil to react, the individual can also discriminate between them subjectively and vice versa. Lack of harmony between the two is found only in ocular hysteria, simulation and cortical amblyopia. Each of these again can be differentiated. Because of the above diagnostic possibilities and the fact that, since we can numerically measure, not only the direct, but also the consensual reaction, we are in a position in many

* Read before the Section on Eye, Ear, Nose and Throat of the Medical Society of California at Yosemite National Park, May 16, 1922.

cases to localize obstructions or lesions in the different parts of the reflex arc. It is for this reason that the instrument is called the "Differential Pupilloscope." In addition it enables us to positively diagnose a "sluggish reaction" before this becomes apparent by our best clinical methods. On the other hand, in a series of 108 neurological cases, which are reported elsewhere by Dr. Mehrtens and the author, twelve cases which had clinically been diagnosed as Argyll-Robertson pupils, because of their sluggish reactions, were proved by the pupilloscope to be normal. This discrepancy between our clinical and pupilloscopic examinations is accounted for by the fact that the former are based on the arc, the amplitude, speed, etc., of the reaction. These factors obviously vary, not only according to the judgment of the individual observer, but also in themselves inasmuch as they are influenced by the structure of the iris. Thus the senile iris and sphincter are stiffer than a young one; a brown iris stiffer than a blue one. These factors do not, however, affect the reactivity as tested by our method. It is true, on the other hand, that the results obtained with the instrument require an exact ocular examination and considerable personal experience on the part of the observer.

In practice I have found the method of particular value in the following:

1. Deformed pupils, if pathological, show diminution of reactivity of part or of the whole sphincter.
2. Anisokoria. If due to pathological lesion, the reactivity is affected. In congenital cases it is normal.
3. Early diagnosis of Argyll-Robertson as well as other pupillary lesions such as iridoplegia and ophthalmoplegia interna.
4. Definite diagnosis of Argyll-Robertson pupil in presence of optic atrophy, opacities of the media, or even of synechae, so long as in the latter case a portion of the pupil is not mechanically impeded in its freedom of movement.

The value of the above is evident to any one familiar with the significance of pupillary lesions. It is a matter of general knowledge that the true Argyll-Robertson pupil (reflex iridoplegia) occurs only in neuro-syphilis. It is often isolated and may precede by many years all other signs of the disease. At the present time it is of interest to note that in encephalitis lethargica the Argyll-Robertson pupil does not occur, whereas ophthalmoplegia interna is frequent.

Lay Control of Medicine—Lay control and dictation of the management of the institutions in which medical men are interested directly or indirectly is bound to come unless something is done to prevent it. Not alone this, but lay control of everything pertaining to the practice of medicine eventually will come unless the spineless doctors who fail to see the growing tendency of the times awaken to the danger and put on their fighting clothes in an attempt to save a reasonable amount of independence for themselves. This is no idle dream, and those who think differently will have occasion to learn the truth perhaps when it is too late.—Indiana Medical Journal, September 15, 1922.

INTRA VITAM BONE MARROW PUNCTURE IN PERNICIOUS ANEMIA*

By ERNEST H. FALCONER, M. D., San Francisco and LAIRD M. MORRIS, M. D., San Francisco

Laird M. Morris has devised a small drill, carrying an outer casing and driven by a dental engine, the drill being attached to the dental engine in the same manner as an ordinary dental drill. This drill will readily penetrate the cortex of the long bones. When this is accomplished the drill proper, marked in the illustration (B) is withdrawn from the puncture wound, leaving the casing (C) in situ. Through this casing a sample of the marrow is reamed out with the screw-like instrument marked (A).

TECHNIQUE OF OPERATION

In our experiments we have always selected the tibia for the purpose of puncture on account of its accessibility. The site usually chosen is about the juncture of the middle and upper third. The skin over this area is carefully sterilized with tincture of iodine and alcohol, and 2 per cent novocain used to accomplish local anaesthesia both of skin and underlying periosteum. The skin incision need not be over 1 cm. in length, being careful to divide the periosteum underneath. Only moderate pressure is used to force the drill down as it is penetrating the cortex of the bone. As it works its way down through the bone the drill usually becomes heated and cauterizes the puncture. The technique concerning a sterile field and asepsis should be impeccable. As soon as the cortex is pierced and the drill removed with the casing in situ, the small screw-like instrument is carefully passed down the casing to the marrow. After several turns it is lifted out and the marrow smeared on sterile cover slips attempting to secure a thin, uniform distribution on the cover slip. These smears are dropped into absolute methyl alcohol for fixation and are stained with the May-Grünwald stain, counterstained with Giesma's stain for good cell differentiation. Wright's stain may be used, but does not seem to be quite as satisfactory as the above method.

INTREPRETATION OF BONE MARROW SMEARS

After one has secured a bone marrow smear and prepared it the interpretation of the specimen is fraught with considerable difficulty. It will be evident to any one familiar with blood work that several smears must be studied. In the leukemias the marrow smears are not so difficult to interpret as the marrow is very cellular and the type of cell is suggestive of the condition. In pernicious anemia the interpretation is far more difficult and a discussion of this problem involves a consideration of the accepted ideas of bone marrow pathology in this disease. The viewpoint put forward by Ehrlich in 1898 that pernicious anemia is a primary disease of the bone marrow, a "megaloblastic degeneration," i. e., a degenerative change in which the marrow reverts to its embryonic type of red cell production, has not been fully supported by clinical observation and experimental evidence.

* Read before the Section on General Medicine of the Medical Society of California at Yosemite National Park, May 16, 1922.